



1550-SPL

CLEAN VERSION

CLAIMS

We claim:

- 1 1. A structure, comprising:
2 a plurality of cells of a cured resinous material, each cell being joined to at least one
3 other cell.

- 1 2. The structure according to claim 1, wherein the cells are solid.

- 1 3. The structure according to claim 1, wherein the cells are hollow.

- 1 4. The structure according to claim 3, wherein the hollow cells are filled with fluid.
- 1 **BI** 5. The structure according to claim 4, wherein the fluid is a gas.

- 1 6. The structure according to claim 4, wherein the fluid is a liquid.

- 1 7. The structure according to claim 1, wherein the resinous material comprises an
2 epoxy curable with ultraviolet radiation.

- 1 8. The structure according to claim 4, wherein an interior of the cells has a fluid
2 pressure substantially similar to an ambient pressure external to the cells.

- 1 9. The structure according to claim 1, wherein the cells all have a similar size.

- 1 10. The structure according to claim 1, wherein the cells are joined together to form a
2 wall of a tubular structure having continuous walls.

1 11. The structure according to claim 1, wherein the cells are arranged in a plurality of
2 parallel planes.

1 12. The structure according to claim 11, wherein cells in plurality of adjacent planes
2 are arranged in different positions orthogonal to the planes.

1 13. The structure according to claim 11, wherein the cells in a plurality of adjacent
2 planes are aligned in a direction perpendicular to the planes.

1 14. The structure according to claim 11, wherein the number of cells in each plane
2 differs.

1 15. A method of forming a structure, the method comprising:
2 forming a plurality of individual cells each comprising a mass of uncured resin;
3 contacting some of the cells with others; and
4 curing the resin.

1 16. The method according to claim 15, further comprising:
2 injecting fluid into the masses of uncured resin to inflate the cells of resin.

1 17. The method according to claim 16, wherein the fluid is a liquid.

1 18. The method according to claim 16, wherein the fluid is a gas.

1 19. The method according to claim 17, further comprising:
2 solidifying the liquid after injecting it into the cells.

1 20. The method according to claim 15, wherein the structure is formed by
2 sequentially forming the cells in a plurality of planes and joining cells in each plane to cells in
3 an adjacent previously formed plane of cells.

1 21. The method according to claim 20, wherein the number of cells formed in each
2 plane differs.

1 22. The method according to claim 20, wherein cells in a plurality of adjacent planes
2 are arranged in different positions orthogonal to the planes.

1 23. The method according to claim 20, wherein cells in a plurality of adjacent planes
2 are aligned in a direction perpendicular to the planes.

1 24. The method according to claim 16, further comprising:
2 evacuating the fluid from the interior of the cells after curing the resin.

1 25. The method according to claim 24, further comprising:
2 injecting another fluid into the cells after evacuating the fluid utilized in inflating the
3 cells.

1 26. The method according to claim 25, wherein the fluid is a gas.

1 27. The method according to claim 25, wherein the fluid is a liquid.

1 28. The method according to claim 27, further comprising:
2 solidifying the liquid after injecting into the inflated cell.

1 29. The method according to claim 24, wherein the fluid is evacuated until an interior
2 of the cells has a gas pressure substantially similar to an ambient pressure external to the cells.

1 30. The method according to claim 25, wherein the other fluid is injected into the
2 cells until an interior of the cells has a gas pressure substantially similar to an ambient
3 pressure external to the cells.

1 31. The method according to claim 15, wherein forming the cells of uncured resin
2 comprises:
3 feeding the uncured resin through a plurality of resin flow apertures in a plate.

1 32. The method according to claim 15, wherein all of the cells are formed of a similar
2 size.

1 33. The method according to claim 15, wherein curing the resin comprises exposing
2 the resin to at least one of ultraviolet radiation, heat, visible light, an electron beam, and
3 microwave radiation.

1 34. An apparatus for creating a structure comprising a plurality of cells of cured
2 resinous material, the apparatus comprising:
3 a plurality of resin flow apertures arranged to permit cells formed at one aperture to
4 contact cells formed at directly adjacent apertures; and
5 a resin flow control member arranged in each resin flow aperture and operable to
6 control a flow of resin from the resin flow apertures.

- 1 35. The apparatus according to claim 34, further comprising:
2 a liquid injection port arranged in each resin flow aperture for injecting liquid into a
3 cell of uncured resin flowing out of the resin flow aperture to inflate the cell; and
4 a liquid flow control member operable to control a flow of liquid through the port.
- 1 36. The apparatus according to claim 35, wherein the liquid comprises gas.
- 1 37. The apparatus according to claim 35, wherein the liquid comprises a fluid.
- 1 38. The apparatus according to claim 34, further comprising:
2 a forming plate that the resin flow apertures are formed through.
- 1 39. The apparatus according to claim 34, further comprising:
2 at least one cell-retaining member for retaining the cells after curing of the resinous
3 material.
- 1 40. The apparatus according to claim 34, further comprising:
2 a source of energy for curing the uncured resin.
- 1 41. The apparatus according to claim 40, wherein the energy source comprises at least
2 one of a source of ultraviolet radiation, a heat source, a source of visible light, an electron
3 beam source, and a source of microwave radiation.
- 1 42. The apparatus according to claim 34, wherein the resin flow control member
2 comprises a shutter valve.
- 1 43. The apparatus according to claim 34, wherein a position of the resin flow
2 aperture is alterable.

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1 44. The apparatus according to claim 34, wherein the apparatus form cells having a
2 substantially uniform size

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1 45. A structure comprising:
2 a plurality of groups of cells of cured resinous material, each group of cells
3 being joined to at least one other group of cells and each cell being joined to at least one other
4 cell.

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1 46. The structure according to claim 45, wherein the cells in each group are co-
2 planar.

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1 47. The structure according to claim 45, wherein the cells within each group have
2 a uniform size.

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1 48. The structure according to claim 45, wherein the cells among the groups have a
2 uniform size.